

Appln. No. 09/888,482
Amendment dated December 29, 2004
Reply to Office Action of October 5, 2004

Amendments to the Claims:

Please cancel claims 3, 13 and 22, amend claims 1, 4, 11, 14, 21 and 23, and add new claims 30-43 as follows. The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended). A document reading apparatus comprising:

a document table for supporting a single document;
a document tray for receiving a stack of documents;
5 a line sensor for reading an image from each of the documents in units of lines parallel to a main scanning direction;
a sensor transporter for transporting the line sensor to scan the document on said document table from one reading surface edge in the sub-scanning direction during a first reading mode;
10 a document feeder for feeding each document received in said document tray such that the document is scanned from another reading surface edge opposite to the one reading surface edge of

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the document on said document table in the sub-scanning direction
15 during a second reading mode; and

a processing section for processing a reading result of said
line sensor as image data;

wherein said processing section has a controller for
controlling a read start timing to compensate for a read range
20 which may positionally deviate with respect to an identical
effective reading area of each document between the first and
second reading modes, and

wherein said controller is configured such that the read
start timing is set in the first reading mode at a timing that
25 transportation of said line sensor is started from a reference
reading position where a reading surface edge of the document
faces said line sensor, and is set in the second reading mode at
a timing that the effective reading area reaches said line sensor
located at the reference reading position.

Claim 2 (Original). A document reading apparatus according
to claim 1, wherein:

said document table is transparent;

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said line sensor is disposed below said document table to
5 face a document placed on said document table with a reading
surface thereof faced down; and

said document feeder is configured to feed a document
received in said document tray with a reading surface thereof
faced up such that the reading surface faces to said line sensor.

Claim 3 (Cancelled).

Claim 4 (Currently Amended). A document reading apparatus
according to claim 3 1, wherein said controller is configured to
confirm that the document is fed over said line sensor by an
idle-feeding distance, to obtain the read start timing in the
5 second reading mode.

Claim 5 (Original). A document reading apparatus according
to claim 4, wherein said controller is configured to calculate
said idle-feeding distance based on a sub-scanning directional
dimension of the document, a sub-scanning directional dimension
5 of an image to be produced according to the image data, and
sub-scanning directional magnification.

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Claim 6 (Original). A document reading apparatus according to claim 5, wherein said controller includes a document size detector which detects the sub-scanning directional dimension of the document received in said document tray.

Claim 7 (Original). A document reading apparatus according to claim 6, wherein said controller further includes an operation panel which enters the sub-scanning directional dimension of an image to be produced according to the image data, and the 5 sub-scanning directional magnification.

Claim 8 (Original). A document reading apparatus according to claim 5, wherein controller includes an operation panel which enters the sub-scanning directional dimension of the document received in said document tray.

Claim 9 (Original). A document reading apparatus according to claim 8, wherein said operation panel is configured to further enter the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning 5 directional magnification.

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Claim 10 (Original). A document reading apparatus according to claim 5, wherein the controller includes an operation panel which enters the idle-feeding distance.

Claim 11 (Currently Amended). A document reading apparatus comprising:

a document table which supports a single document;
a document tray which receives a stack of documents;
5 a line sensor which reads an image from each of the documents in units of lines parallel to a main scanning direction;
a sensor transporter which transports the line sensor to scan the document on said document table from one reading surface edge in the sub-scanning direction during a first reading mode;
10 a document feeder which feeds each document received in said document tray such that the document is scanned from another reading surface edge opposite to the one reading surface edge of the document on said document table in the sub-scanning direction
15 during a second reading mode;
a processing section which processes a reading result of said line sensor as image data; and
a controller which controls a read start timing to compensate for a read range which may positionally deviate with

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20 respect to an identical effective reading area of each document between the first and second reading modes,

wherein said controller is configured such that the read start timing is set in the first reading mode at a timing that transportation of said line sensor is started from a reference 25 reading position where a reading surface edge of the document faces said line sensor, and is set in the second reading mode at a timing that the effective reading area reaches said line sensor located at the reference reading position.

Claim 12 (Previously Presented). A document reading apparatus according to claim 11, wherein:

said document table is transparent;

5 said line sensor is disposed below said document table to face a document placed on said document table with a reading surface thereof faced down; and

said document feeder is configured to feed a document received in said document tray with a reading surface thereof faced up such that the reading surface faces to said line sensor.

Claim 13 (Cancelled).

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Claim 14 (Currently Amended). A document reading apparatus according to claim 13 11, wherein said controller is configured to check that the document is fed over said line sensor by an idle feeding distance, to obtain the read start timing in the 5 second reading mode.

Claim 15 (Previously Presented). A document reading apparatus according to claim 14, wherein said controller is configured to calculate said idle-feeding distance based on a sub-scanning directional dimension of the document, a sub-scanning directional dimension of an image to be produced according to the image data, and sub-scanning directional magnification. 5

Claim 16 (Previously Presented). A document reading apparatus according to claim 15, wherein said controller includes a document size detector which detects the sub-scanning directional dimension of the document received in said document tray. 5

Claim 17 (Previously Presented). A document reading apparatus according to claim 16, wherein said controller further includes an operation panel which enters the sub-scanning

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directional dimension of an image to be produced according to the
5 image data, and the sub-scanning directional magnification.

Claim 18 (Previously Presented). A document reading apparatus according to claim 15, wherein said controller includes an operation panel which enters the sub-scanning directional dimension of the document received in said document tray.

Claim 19 (Previously Presented). A document reading apparatus according to claim 18, wherein said operation panel is configured to further enter the sub-scanning directional dimension of an image to be produced according to the image data,
5 and the sub-scanning directional magnification.

Claim 20 (Previously Presented). A document reading apparatus according to claim 15, wherein said controller includes an operation panel which enters the idle feeding distance.

Claim 21 (Currently Amended). A controlling method in a document reading apparatus comprising the steps of:
checking a presence of a document on a document table;
checking a presence of a document in a document tray;

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5 reading an image from the document in units of lines parallel to a main scanning direction by a line sensor;
setting a first reading mode when the document is present on the document table and moving a sensor transporter which transports the line sensor to scan the document on said document
10 table from one reading surface edge in the sub-scanning direction during the first reading mode;
setting a second reading mode when the document is present in the document tray and feeding the document received in the document tray such that the document is scanned from another
15 reading surface edge opposite to the one reading surface edge of the document on said document table in the sub-scanning direction during the second reading mode;
controlling a read start timing to compensate for a read range which may positionally deviate with respect to an identical
20 effective reading area of each document between the first and second reading modes; and
processing a reading result of said line sensor as image data,
wherein setting the read start timing in the first reading mode at a timing that transportation of said line sensor is started from a reference reading position where a reading surface edge of the document faces said line sensor; and

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wherein setting the read start timing in the second reading mode at a timing that the effective reading area reaches said line sensor located at the reference reading position.

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Claim 22 (Cancelled).

Claim 23 (Currently Amended). A controlling method according to claim ~~22~~ 21, wherein checking that the document is fed over said line sensor by an idle feeding distance is performed to obtain the read start timing in the second reading mode.

Claim 24 (Previously Presented). A controlling method according to claim 23 further comprising the step of:

5 calculating said idle-feeding distance based on a sub-scanning directional dimension of the document, a sub-scanning directional dimension of an image to be produced according to the image data, and sub-scanning directional magnification.

Claim 25 (Previously Presented). A controlling method according to claim 24 further comprising the step of:

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detecting the sub-scanning directional dimension of the document received in said document tray by a document size
5 detector.

Claim 26 (Previously Presented). A controlling method according to claim 25 further comprising the step of:

entering the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning
5 directional magnification from an operation panel.

Claim 27 (Previously Presented). A controlling method according to claim 24 further comprising the step of:

entering the sub-scanning directional dimension of the document received in said document tray from an operation panel.

Claim 28 (Previously Presented). A controlling method according to claim 27 further comprising the step of:

entering the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning
5 directional magnification from said operation panel.

Claim 29 (Previously Presented). A controlling method according to claim 24 further comprising the step of:

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entering the idle feeding distance from an operation panel.

Claim 30 (New). A document reading apparatus comprising:

a document table for supporting a single document;

a document tray for receiving a stack of documents;

a document feeder for feeding each document of the stack of

5 documents received in said document tray;

a sensor for reading an image of the document on the document table from one reading surface edge of the document in a first reading mode and an image of the document fed by said document feeder from another reading surface edge of the document opposite to the one reading surface edge in a second reading mode;

a setting section for setting magnification to determine a part of the document whose image is enlarged; and

15 a processing section for capturing an output signal from said sensor to convert the output signal into image data,

wherein said processing section is configured to control a start timing of capture according to a distance between each of the one reading surface edge and the another reading surface edge and the part of the document.

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Claim 31 (New). A document reading apparatus according to claim 30, wherein said distance is an idle-feeding distance in which the document is fed without conversion of the output signal from said sensor into image data, and is determined based on the size of a copy sheet in addition to the magnification.

Claim 32 (New). A document reading apparatus according to claim 31, wherein said idle-feeding distance L is given by the equation:

$$L = (L_a \times M - L_b) / M$$

where L is the size of the document as measured in a scanning direction, L_b is the size of the copy sheet as measured in the scanning direction, and M is the magnification determined with respect to the scanning direction.

Claim 33 (New). A document reading apparatus according to claim 30, wherein:

said document table is transparent;

said sensor is disposed below said document table to face a document placed on said document table with a reading surface thereof faced down; and

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said document feeder is configured to feed a document received in said document tray with a reading surface thereof faced up such that the reading surface faces said sensor.

Claim 34 (New). A document reading apparatus according to claim 32, wherein said processing section is configured to start capture of the output signal from said sensor when the document is fed over said sensor by the idle-feeding distance in the 5 second reading mode.

Claim 35 (New). A document reading apparatus according to claim 34, wherein said setting section includes a document size detector which detects the size of the document received in said document tray.

Claim 36 (New). A document reading apparatus according to claim 34, wherein said setting section includes an operation panel which enters the size of the document received in said document tray.

Claim 37 (New). A control method in a document reading apparatus which includes a document table for supporting a single document, a document tray for receiving a stack of documents, a

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document feeder for feeding each document of the stack of
5 documents received in said document tray, and a sensor for
reading an image of the document on the document table from one
reading surface edge of the document in a first reading mode and
an image of the document fed by said document feeder from
another reading surface edge of the document opposite to the one
10 reading surface edge in a second reading mode, said method
comprising:

setting magnification to determine a part of the document
whose image is enlarged;

15 capturing an output signal from said sensor to convert the
output signal into image data; and
controlling a start timing of capture according to a
distance between each of the one reading surface edge and the
other reading surface edge and the part of the document.

Claim 38 (New). A control method according to claim 37,
wherein said distance is an idle-feeding distance in which the
document is fed without conversion of the output signal from said
sensor, and is determined based on the size of a copy sheet in
5 addition to the magnification.

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Claim 39 (New). A control method according to claim 38, wherein said idle-feeding distance L is given by the equation:

$$L = (La \times M - Lb)/M$$

where La is the size of the document as measured in a scanning direction, Lb is the size of the copy sheet as measured in the scanning direction, and M is the magnification determined with respect to the scanning direction.

Claim 40 (New). A control method according to claim 37, wherein:

said document table is transparent;

5 said sensor is disposed below said document table to face a document placed on said document table with a reading surface thereof faced down; and

said document feeder is configured to feed a document received in said document tray with a reading surface thereof faced up such that the reading surface faces said sensor.

Claim 41 (New). A control method according to claim 39, wherein capture of the output signal from said sensor starts when the document is fed over said sensor by the idle-feeding distance in the second reading mode.

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Claim 42 (New). A control method according to claim 41,
further comprising detecting the size of the document received in
said document tray by a document size detector.

Claim 43 (New). A control method according to claim 41,
further comprising entering the size of the document received in
said document tray from an operation panel.